



Pre-tensioning with ITH-**Tension Nut**

- ✓ Perfect for high temperature application
- ✓ No need for new bolts
- ✓ High repeatability
- ✓ No friction



Bolt stretching by means of differential thread

Tensioning of bolts with ITH-Tension Nut

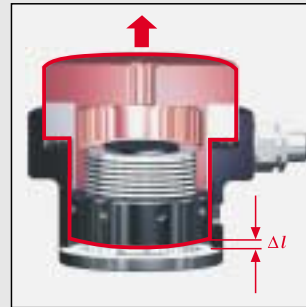
Function of the ITH-Tension Nut



1. Assembling of the ITH-Tension Nut on a bolt with the turning device



2. Assembling of the bolt-tensioning cylinder



3. Pulling of the bolt



4. Adjusting of the pressure sleeve with a pin

General remarks

Bolts which are pre-tensioned by the ITH stretch method require a thread projection of 0.8 to 1.0 x thread diameter above the nut for the hydraulic tool. As this projection does not normally exist, the bolts in place have to be replaced by longer ones.

When the ITH-tension nuts are used, the existing nuts are replaced by the tensioning nuts. The existing bolts do not have to be replaced.

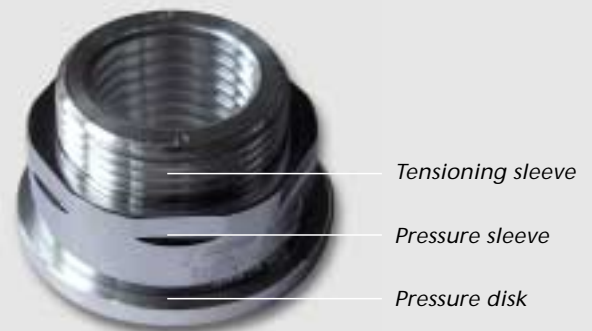
With the ITH-tension nuts, the bolt is stretched only in an axial direction. This means that the ITH-tension nut is ideal for joints which are subjected to high temperatures because (in contrast to the torque process) the static friction does not have to be overcome when the bolt is loosened.

When the torque process is used with bolt joints which are subject to thermal stresses, a torque has to be applied which is between 2.5 and 4 times greater, depending on the temperature in question to open the bolt. This often causes such serious damage to the bolts or nuts that they have to be replaced, thereby creating additional costs. In addition, the torque tool is often damaged by the sudden release of energy during loosening (Additional cost).

Function

The method by which the three-part patented ITH-tension nut works is based on the principle of the differential thread. A special threaded sleeve (tensioning sleeve) which is screwed onto the bolt transmits the axial pre-tensioning force from the bolt via the sleeve to the pressure disk and then to the flange. This causes axial stretching of the bolt which means that no additional torsion or other stresses can occur in the bolt. This causes purely axial stretching of the bolt. The pressure sleeve is then turned into position by a device on the bolt-tensioning cylinder or by a pin to the pressure disk.

The ITH tension nut consists of three parts:



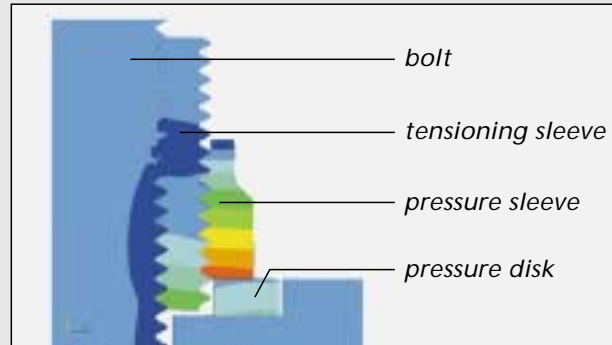
The ITH-Tension Nut offers you the following advantages:

- ✓ high cost savings (no new bolts)
- ✓ use of existing bolts
- ✓ ideal for thermally stressed joints
- ✓ easy assembly

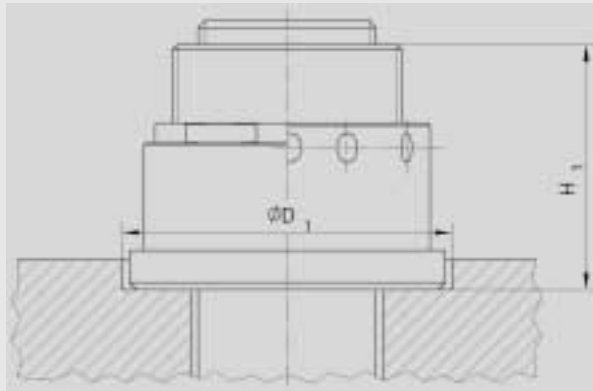
- ✓ no friction, simple bolt design
- ✓ high reproducibility
- ✓ mechanical components – no hydraulic components (hydraulic nuts)

FE arrangement

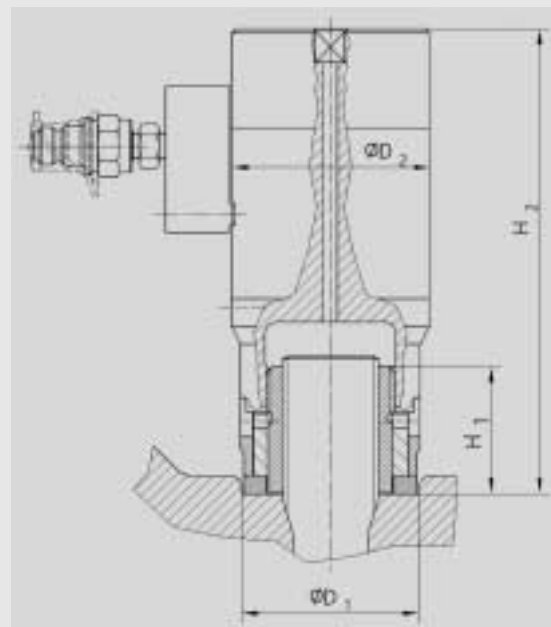
The patented ITH-tension nut produces better distribution of stresses in the bolt. In contrast to conventional nuts, the use of the patented ITH-tension nut considerably improves the fatigue strength of the bolt. Through the special thread of the tensioning sleeve and the geometric arrangement, a very even distribution of stresses is achieved in the components of the patented ITH-tension nuts. All the patented ITH-tension nuts have been calculated with finite elements (FE).



Even distribution of stresses on the bolt.



Tension nut with hexagon head / bore



Tension nut with bolt-tensioning cylinder

Tension nuts for expansion bolts and inch-bolts max. 60ksi						Bolt-tensioning cylinder				
type	order-no.	thread*	max. tension force (kN)	required casingø (mm)	total height (mm)	type	order-no.	thread	outerø (mm)	total height (mm)
TN 30		M 30	290	55	43	ES 30-290		M 30		
TN 33		M 33 / 1,25"	385	61	50	ES 33-385		M 33 / 1,25"		
TN 36		M 36	450	67	52	ES 36-450		M 36		
TN 39		M 39 / 1,5"	565	72	59	ES 39-565		M 39 / 1,5"		
TN 42		M 42	620	78	60	ES 42-620		M 42		
TN 44		1,75"	785	83	70	ES 1,5"-785		1,75"		
TN 45		M 45	715	88	65	ES 45-715		M 45		
TN 48		M 48	815	96	69	ES 48-815		M 48		
TN 52		M 52 / 2,0"	1.000	97	78	ES 52-1000		M 52 / 2,0"		
TN 56		M 56	1.125	104	82	ES 56-1125		M 56 / 2,25"		
TN 57		2,25"	1.325	107	89	ES 2,25"-1325		2,25"		
TN 63		2,5"	1.650	119	99	ES 2,5"-1650		2,5"		
TN 64		M 64	1.500	116	93	ES 64-1500		M 64 / 2,5"		
TN 72		M 72 x 6	2.000	132	108	ES 72-2000		M 72 / 2,75"		
TN 80		M 80 x 6 / 3,0"	2.500	148	118	ES 80-2500		M 80 / 3,0"		
TN 90		M 90 x 6	3.250	168	135	ES 90-3250		M 90 / 3,5"		
TN 100		M 100 x 6	4.100	187	150	ES 100-4100		M 100		
TN 102		4,0"	4.500	194	157	ES 4,0"-4500		4,0"		

Subject to technical change · *Other sizes and forces available on request · Status 2004



Tension Nut Applications



ITH-Tension Nut TN 140
Pre-tensioning of expansion bolts
M 140 x 6 in a confined space on a
rolling-mill stand.



ITH-Tension Nut TN 36
Pre-tensioning of bolts on the foundation
of a wind-power generator.



ITH-Tension Nut TN 72
Pre-tensioning of joint nuts M 72 x 6 in
the high-temperature zone (550°) of a
gas turbine.

ITH is a system supplier providing a complete package consisting of bolting tools and special bolts.

The leading position on the market earned by ITH is reflected in the following facts:

- worldwide distribution network
- international patents
- expert advisory service by qualified mechanical engineers (not salesmen) in all questions involving bolts
- experience in the bolting technology for more than 25 years
- fast service

Worldwide Network

